Exponential Growth and Decay Problems 4 **Name**_____

1) Which of the exponential functions below show **growth** and which show **decay**?

a) $y = 5(2)^x$ b) $y = 100(.5)^x$ c) $y = 80(1.3)^x$

d) $y = 20(0.8)^x$ e) $y = 20(1+0.025)^x$ f) $y = 40(1-0.4)^x$

2) Since 2000, the population of the city of Brownville has grown according to the mathematical model $y = 720{,}500(1.022)^x$.

a) Explain what 720,500 represents in this model.

b) Explain what 1.022 represents in this model.

c) Predict the population in 2020 (after 20 years).

d) Use this model to predict about when the population will first reach 1,000,000.

3) A population of 800 beetles is growing each month at a rate of 5%.

a) Write an equation to express the number of beetles at time x.

b) About how many beetles will there be in 8 months?

The fifth Beatle

4) Your new computer cost $1500 but it depreciates in value by about 18% each year.

a) Write an equation to show the value of the computer at x years.

b) How much will your computer be worth in 6 years?

c) About how long will it take before your computer is worth less than 1 dollar, according to your equation?

d) According to your equation, will the value of the computer ever be negative? (Less than 0 dollars.)

5) You invest $100,000 in an account with 3% interest, compounded quarterly.

a) Write an equation that gives the amount of money after x years.

b) How much money will you have after 10 years?

c) How much money will you have after 25 years?